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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,961	10/27/2003	Terry L. Gilton	MI22-2428	8007

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EXAMINER

LANDAU, MATTHEW C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 03/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/695,961

Applicant(s)

GILTON, TERRY L.

Examiner

Matthew Landau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 61-65, 68 and 69 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 61-65, 68 and 69 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 61-65, 68, and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (US Pat. 6,087,674, hereinafter Ovshinsky) in view of Schultze and Heath et al. (US Pat. 6,756,296, hereinafter Heath).

Regarding claims 61-65 and 68, Figures 1 and 3 of Ovshinsky disclose a semiconductor construction, comprising a semiconductor substrate 10; an insulative material 39 over the semiconductor substrate; trenches extending within the insulative material; a first conductive wiring layer 8A/12 within the trenches and partially filing the trenches; a switchable memory material 36 over the first conductive layer; and a second conductive wiring layer 6/42 over the memory material. Figure 3 of Ovshinsky discloses an array of multiple memory elements 30, which have the same construction as that shown in Figure 1. Therefore, Ovshinsky discloses more than one trench over the substrate. The difference between Ovshinsky and the claimed invention is an active molecular switchable memory material within a p-type porous silicon matrix. Schultze discloses an active molecular switchable material within a porous silicon matrix (see abstract), wherein the material within the pores can be electrochemically switched between two different conducting states (see abstract), and wherein the porous silicon is p-type (see section 2.2, 2nd paragraph). Schultze also discloses the two stable states of the material are

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interchanged by oxidation and reduction of the material (page 1374, 2nd col., lines 6-9). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Ovshinsky by using the molecular switchable material in a p-type porous silicon matrix as taught by Schultze for the purpose of using a switchable material with a faster switching speed while occupying less space. A further difference between Ovshinsky and the claimed invention is the first and second wiring layers comprise conductively doped silicon, and the first wiring layer is doped with n-type dopant. Figure 3 of Heath discloses a memory device with a molecular switchable material between first and second electrodes (12 and 18, respectively). Heath discloses the first electrode is made of n-doped silicon (col. 9, lines 40-42) and the second electrode is made of amorphous silicon (col. 7, lines 65-67). Note that amorphous silicon must be doped to be function as a conductive electrode. In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to further modify the invention of Ovshinsky by using the electrode materials of Heath for the purpose of selecting well-known, inexpensive conductive materials. A further difference between Ovshinsky and the claimed invention is the active molecular switchable material comprises redox-active catenane, rotaxane, or pseudorotaxane. Figure 3 of Heath discloses a memory device (col. 5, lines 56-60 and col. 12, lines 52-65) comprising a bistable molecular switchable material 13 made from rotaxane, pseudorotaxane, or catenane (col. 7, lines 1-5). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to further modify the invention of Ovshinsky by using the switchable material of Heath for the purpose of selecting an active molecular switchable material that is well known in the art to have good switching characteristics. Note that Figure 1 of Ovshinsky discloses the switchable

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memory material 36 is over and directly against the first conductive wiring layer 8A and the second conductive wiring layer 42 is over and directly against the switchable memory material 36. Therefore, when the porous silicon memory material of Schultz is combined the device of Ovshinsky, the first and second conductive wiring layers will be directly against the porous silicon.

Regarding claim 69, Figure 3 of Ovshinsky discloses the first conductive wiring layer 8A/12 defines lines extending primarily along a first direction; and wherein the second conductive wiring layer is formed in a shape of a line extending primarily along a second direction substantially perpendicular to the first direction.

Response to Arguments

Applicant's arguments filed January 27, 2005 have been fully considered but they are not persuasive.

In response to Applicant's arguments, that "the references do not suggest or disclose the recited p-type doped porous silicon and n-type conductively doped silicon, in direct contact with one another", as stated in the above rejection, Schultze discloses the porous silicon is made from a p-type semiconductor, and is therefore p-type. Heath discloses an n-type doped silicon wiring layer. Figure 1 of Ovshinsky discloses a memory material in direct contact with upper and lower conductive wiring layers. Therefore, when the porous silicon of Schultze and the n-type doped silicon wiring layer of Heath combined into the structure of Ovshinsky, the wiring layer and the porous silicon will be in direct contact with one another. Applicant further argues that "not one of the Examiner's cited references suggests or discloses the amended claim 61 recited feature of

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a wiring layer comprising n-type conductively-doped silicon in a trench with p-type doped porous silicon also in the trench and directly against the n-type conductively-doped silicon, together with the recited active molecular switchable memory material being within the pores of the p-type doped porous silicon”, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Matthew C. Landau

Examiner

March 24, 2005


TOM THOMAS
SUPERVISORY PATENT EXAMINER